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NEW FISHES OF THE FAMILY CALLIONYMIDAE, MOSTLY PHILIPPINE, OBTAINED BY THE UNITED STATES BUREAU OF FISHERIES STEAMER "ALBATROSS"

By Henry W. Fowler

In my studies of the Indo-Pacific fishes of the family Callionymidae, with special reference to those of the Philippines, I found a number of interesting new species in the collections of the United States National Museum. These are described and figured herein, with the same methods employed as in an earlier paper.[1] Each figure is drawn in lateral view, with an insert showing a dorsal view of the head and predorsal region and a ventral view showing the under surface of the head, together with the chest and breast. The head is measured to the gill opening.

ANALYSIS OF GENERA

a^1. Two distinct dorsal fins.
  b^1. Callionyminae. No supraorbital tentacle; body smooth.
    c^1. Lateral line single.
      d^1. Gill opening superior, above opercle; ventral without free ray.
        e^1. Ventral with last membrane connected to middle of base of pectoral.
          f^1. Gill opening exposed, superior on neck; opercular membrane not free posteriorly.
            g^1. Lateral line simple ..... **Callionymus**
            g^2. Lateral line jointed ..... **Paracallionymus**
          f^2. Gill opening above or hidden by opercle; opercular membrane forms free flap posteriorly ..... **Synchiropus**
        e^2. Ventral with last membrane not united with pectoral; gill opening hidden by opercle ..... **Eleutherochir**

[1] Proc. U. S. Nat. Mus., vol. 85, pp. 31–135, figs. 1–61, 1938.

d^2. Gill opening behind opercle; opercular membrane without free lobe; ventral with free ray, posterior part of fin with ventral membrane united to middle of anterior pectoral base ..... **Dactylopus**

c^2. Two lateral lines ..... **Dicallionymus**

b^2. AMORINAE. Each eye with long tentacle above; gill opening behind preopercular spine; body spinulose ..... **Amora**

a^2. DRACULINAE. Only one dorsal, corresponds to second dorsal of other genera ..... **Draculo**

CALLIONYMINAE, new subfamily

Type genus.—Callionymus Linnaeus.

No supraorbital tentacle. Body smooth. Two distinct dorsal fins.

Genus CALLIONYMUS Linnaeus

ANALYSIS OF SPECIES

a^1. Maxillary entire, without serrae.

b^1. First dorsal spines not prolonged, or but little longer than first ray of second dorsal.

c^1. Chest and breast dark or blackish brown ..... **umbrithorax**

c^2. Chest and breast pale to whitish like rest of under surface of body.

d^1. Preopercular spine slender, straight, with 7 to 9 small antrorse serrae along its inner edge.

e^1. Parietal region rather coarsely rugose; snout but little longer than eye ..... **scabriceps**

e^2. Parietal region with more obscure and radiating striae; snout much longer than eye ..... **boleogenys**

d^2. Preopercular spine more robust, with 4 recurved denticles; eye greatly exceeds short muzzle ..... **marisinensis**

d^3. Preopercular spine with 2 recurved denticles; eye subequal with muzzle ..... **hudsoni**

b^2. Spines of first dorsal more or less prolonged or filamentous.

f^1. Only first dorsal spine free terminally or prolonged.

g^1. Eye subequal with muzzle; inner edge of preopercular spine with 4 or 5 antrorse spinules.

h^1. Preopercular spine inserted close behind eye ..... **longi**

h^2. Preopercular spine inserted well behind eye, or nearer gill opening than eye ..... **brunneus**

g^2. Eye 2 in muzzle; preopercular spine with 7 antrorse spinules along its inner edge ..... **punctilateralis**

f^2. First 2 dorsal spines elongated; preopercular spine with 4 recurved denticles ..... **keeleyi**

f^3. First 3 dorsal spines elongated filaments; preopercular spine short, curved, with 2 curved denticles on inner edge ..... **distethommatus**

a^2. Maxillary with outer edge denticulate in males, entire in females; preopercular spine long, with 4 recurved denticles on its inner edge; chest with a contrasted white band on each side and approximating forward. **leucobranchialis**

CALLIONYMUS UMBRITHORAX, new species

FIGURE 1

Depth 7; head 3⅛, long as wide. Snout 3 in head; eye 3, subequal with snout; maxillary not quite reaching eye, entire; mouth cleft short, reaches halfway to eye, lower jaw very slightly shorter and included in upper jaw; lips narrow; teeth very minute, villiform, in moderate bands in both jaws; interorbital very narrow bony frenum, with longitudinal groove. Preopercular spine large, nearly long as eye, ends

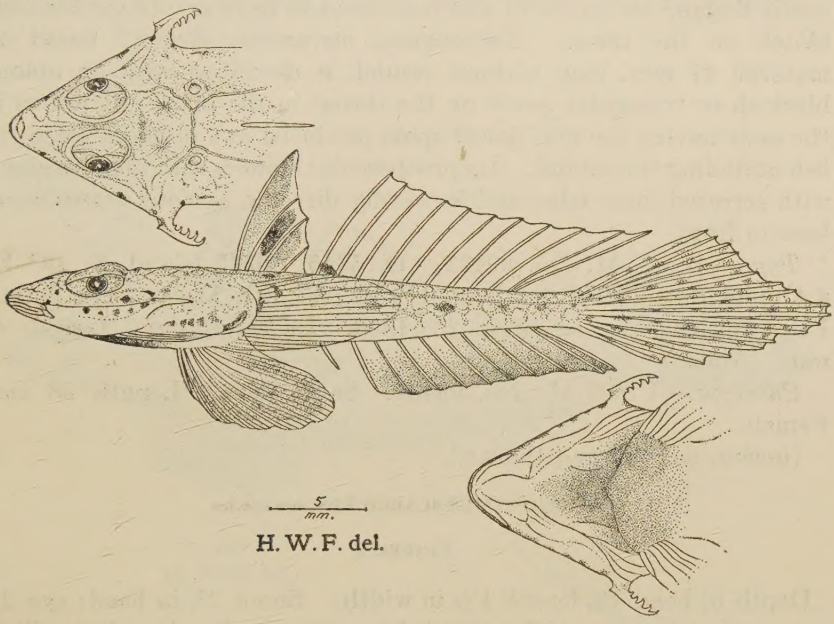

FIGURE 1.—*Callionymus umbrithorax*, new species. Type.

incurved in point followed by four recurved denticles along its inner edge, and a small subbasal denticle in front pointing forward.

Lateral line complete, high along side of back, simple.

D. IV–10, 1 first spine 1⅝ in head, first ray 1½; A. 9, 1, first ray 3; caudal 2¼ in rest of fish, cuneate; least depth of caudal peduncle 5 in head; pectoral 1¼, rays 17; ventral rays I, 5, fin 1⅛ in head. Anal papilla elongate, conic, length half of eye.

Color in alcohol, rather light brown above, with many obscure or faint darker rings and arcs on trunk and tail above. Six dark- to blackish-brown spots close below along lateral line. Various blackish-brown spots scattered about upper surface of head; pair on each side of snout, 2 each side before preopercular spine, and several on opercle especially distinct. Under surface of body largely whitish. Breast and chest blackish brown, dark area extending between bases of ventrals.

First dorsal shaded with dark brown, and large black ocellus on second membrane. Second dorsal largely transparent, with dark basal spot in front. Anal dark brown marginally, pale basally. Caudal white, with 10 transverse rows of dark-brown spots, these chiefly on membranes. Pectoral transparent, with 2 dark spots subbasally above. Ventral becomes dark brown terminally, also with some ill-defined scattered brown spots on rays.

Philippines. A species defined chiefly by the dark-brown color of the breast of the male. It is quite different from *Callionymus maldivensis* Regan,[2] the males of which are said to have an oblong blackish blotch on the throat. *Callionymus margaretae* Regan,[3] based on material 47 mm. long without caudal, is described with an oblong blackish or triangular patch on the throat in the male. It differs in the male having the first dorsal spine produced in a filament 2⅝ in the fish excluding the caudal. Its preopercular spine is said to be straight, with serrated inner edge and forwardly directed spinous extension at base in front.

Type.—U.S.N.M. No. 99433. D. 5345. Cliff Island, S. 43° E., 4.4 miles (lat. 10°50′ N., long. 119°22′03″ E.), Malampaya Sound, Palawan Island. December 26, 1908. In 7 fathoms. Length 47 mm. Male.

Paratype.—U.S.N.M. No. 99434. Same data. Length 38 mm. Female.

(*umbra*, dark place+thorax.)

CALLIONYMUS SCABRICEPS, new species

FIGURE 2

Depth 6; head 3⅘, length 1 1/10 in width. Snout 2⅔ in head; eye 2⅘, subequal with snout, well protruded on upper profile of head; maxillary reaches three-fourths to eye, entire; mouth cleft reaches halfway to eye, upper jaws greatly protractile and mandible shorter or included in upper jaw; teeth very fine, minute, villiform, in narrow bands in jaws; no interorbital space, eyes closely set in apposition. Preopercular spine long, slender, greater than orbit, inner edge with eight antrorse spinules, and small spine at front of base directed forward.

Lateral line elevated, high along side of back, complete. Along and above course of lateral line four short vertical bars of papillae or pores, last over caudal peduncle before caudal fin base. Parietal region of head with striate rugae, rather coarse and irregular.

D. IV–9, 1, first spine 1⅛ in head, first ray 1⅓; A. 8, 1, first ray 2½; caudal 2⅓ in rest of fish, cuneate; least depth of caudal peduncle 4 in

[2] Trans. Linn. Soc. London, ser. 2, vol. 12, Zool., p. 247, pl. 30, fig. 3, 1908 (type locality: Maldives, S. Nilandu, in 30 to 36 fathoms).

[3] Journ. Bombay Nat. Hist. Soc., vol. 16, No. 2, p. 326, pl. 3, fig. 3, 1905 (type locality: Muscat, in 15 to 30 fathoms).

head; pectoral rays 19, fin 1 in head; ventral 3 in fish without caudal, rays I, 5.

Color in alcohol, back brown, with six darker saddlelike cross bands, though ill-defined and more or less obscured by paler rings or blotches, the various shades producing more or less mottled appearance above. Dark-brown blotches also on sides of head and prepectoral region. Eye gray-brown, with darker mottling and spots. Under surface of body uniform whitish. First dorsal with dark-brown spots, obscurely ocellated with paler and with some irregular white spots on last two membranes. Second dorsal transparent, with three and sometimes

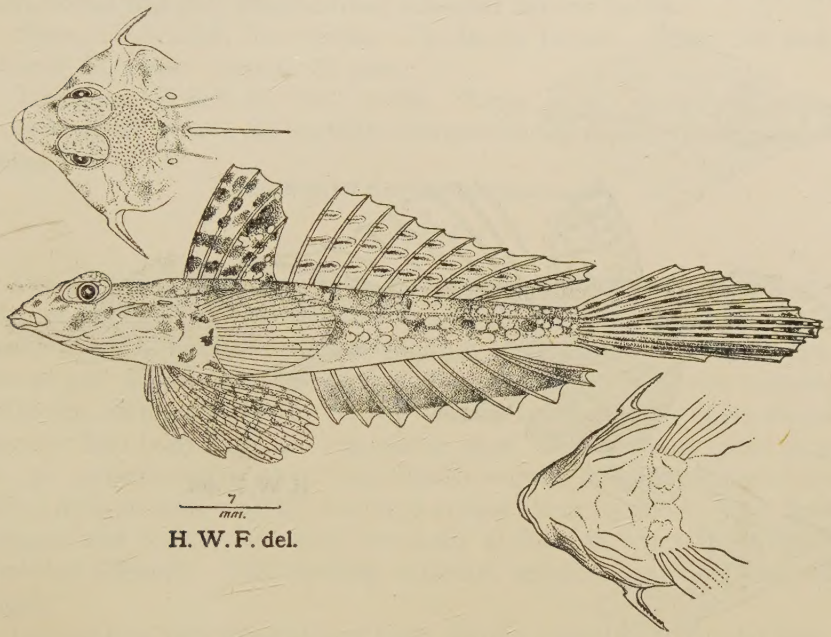

FIGURE 2.—*Callionymus scabriceps*, new species. Type.

four longitudinal rows of black ocelli, subbasal and median series most contrasted. Anal with rays tipped white and submarginally dark brown, shading paler basally on fin. Caudal transparent, with eight transverse dark-brown bands on lower two-thirds of fin, and in each band brownish-black spot, only distinct as fin is expanded. Pectoral largely colorless. Ventral variegated with brown, as pale to whitish spots, producing a mottled appearance.

Philippines. Distinguished by its combination of characters, especially the prominent long slender attenuated preopercular spine, which is 1¼ times the eye and furnished with 8 antrorse spinules along its inner edge, besides a small spine directed forward at its base in front. Top of head rugose. Snout subequal with eye.

Type.—U.S.N.M. No. 99406. Jolo, Jolo Islands. February 8, 1908. Length, 58 mm.

Paratype.—U.S.N.M. No. 99407. Surigao, Mindanao. Fifty-foot seine. May 8, 1908. Length, 38 mm.

(*scaber*, rough + *κεφάλή*, head.)

CALLIONYMUS BOLEOGENYS, new species

FIGURE 3

Depth 7⅕; head 3⅗, width 1⅛ in its length. Snout 2¼ in head; eye 2⅗, 1⅗ in snout; maxillary reaches four-fifths to eye, entire; mouth

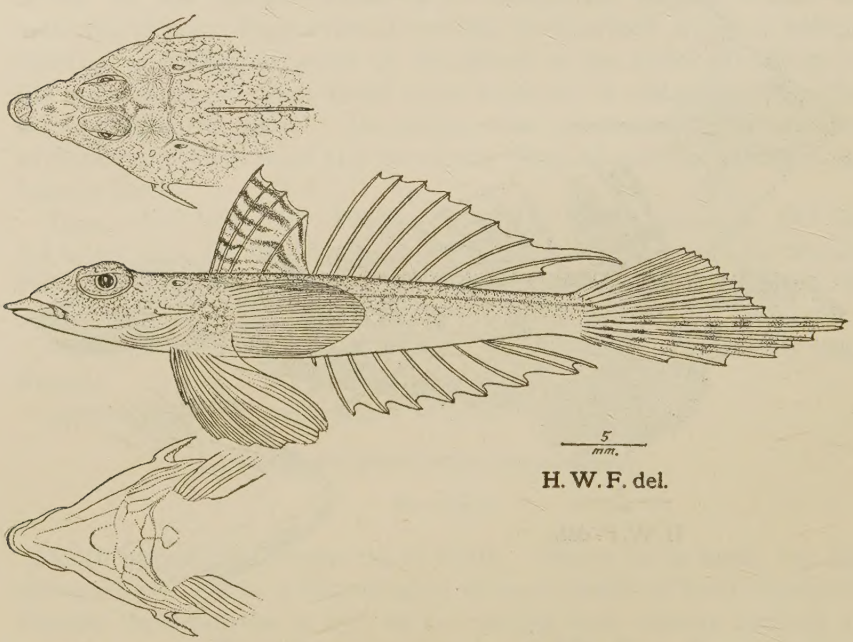

FIGURE 3.—*Callionymus boleogenys*, new species. Type.

cleft reaches two-fifths to eye, long premaxillaries well protruded and a little protractile, lower jaw shorter; teeth very minute, villiform, in narrow bands in jaws, none on palate; interorbital narrow bony frenum, with median longitudinal shallow concave groove. Preopercular spine long, straight, slender, ends in short spine and also short basal spine directed forward; eight fine antrorse serrae along inner edge.

Lateral line complete, high along side of back, and continued on caudal base. Parietals with very fine or weak radiating striae.

D. IV–8, 1, first spine 1⅛ in head, first ray 1⅛; A. 7, 1, first ray 2½; caudal 3⅛ in rest of fish, cuneate, with upper rays graduated shorter; least depth of caudal peduncle 4; pectoral 1⅛, rays 15; ventral rays I, 5, fin equals head. Anal papilla small, short, depressed or subconic fleshy point.

Color in alcohol, back and upper surfaces very pale brown, washed with rose, with still paler to whitish blotches, ringed areas and irregular and slightly darker arcs, circles, etc. Eye gray-white, with pink tinge above, and variegated with gray to dark gray. Under surface of body uniform whitish, with six longitudinal gray bands, variable and irregular. Caudal with seven rows of large blackish blotches on lower half. Fins otherwise all pale to transparent.

Philippines. Characters of distinction are the long, slender preopercular spine which equals the eye, protractile mouth, very pale coloration washed with rose and with pale to whitish spots. The low first dorsal has gray longitudinal lines and narrow bands.

Type.—U.S.N.M. No. 99408. Pandanan Island. Seine, 130 feet. March 23, 1909. Length 51 mm.

Paratype.—U.S.N.M. No. 99409. Same data. Length 32 mm.

(βολίς, dart+γένυς, cheek; with reference to the slender preopercular spine.)

CALLIONYMUS MARISINENSIS, new species

FIGURE 4

Depth 8⅕; head 4, length 1⅛ in its width. Snout 4 in head; eye 2⅒, about twice snout length, enters upper profile of head; maxillary reaches front eye edge, unarmed; mouth cleft reaches halfway to eye, lower jaw slightly shorter or included in upper jaw; teeth minute, villiform, firm, simple, in narrow bands in each jaw; interorbital narrow firm bony keel and separating eyes. Preopercular spine long as eye, ends in rather short and slightly curved in spine, followed by three or four more slightly recurved spines along its inner edge, first longest and fourth (anterior) smallest; at base in front short spine directed forward. Gill opening superior, small, about half long as pupil.

Lateral line high along side of back, simple, complete to caudal base.

D. IV–9, 1, first spine 1⅐ in head, first ray 1½; A. 9, 1, first ray 2⅓; caudal 3½ in rest of fish, rounded behind; least depth of caudal peduncle 4 in head; pectoral 1, rays 18, fin rounded; ventral rays I, 5, long as head. Anal papilla short, depressed, pointed.

Color in alcohol, brown above, with innumerable darker brown lines forming a marbled appearance, due to arcs, curves, rings, and blotches darker and paler. Iris silvery gray. Under surface of body uniform whitish. Dorsal dark or gray black with four whitish oblique bands. Soft dorsal pale or whitish, with faint brown spots on each ray. Anal pale or whitish. Caudal pale, with six brown spots on each membrane, forming dark transverse bands in retracted fin. Paired fins pale, pectoral with brown cross lines and ventral with faint brown spots on each ray.

China Sea. Greatly resembles *Callionymus hudsoni*, but with an entirely different preopercular spine long as eye.

Type.—U.S.N.M. No. 99410. China Sea, vicinity of Hong Kong, lat. 21°44′ N., long. 114°48′ E. In 34 fathoms. August 9, 1908. Length 48 mm. [D. 5303.]

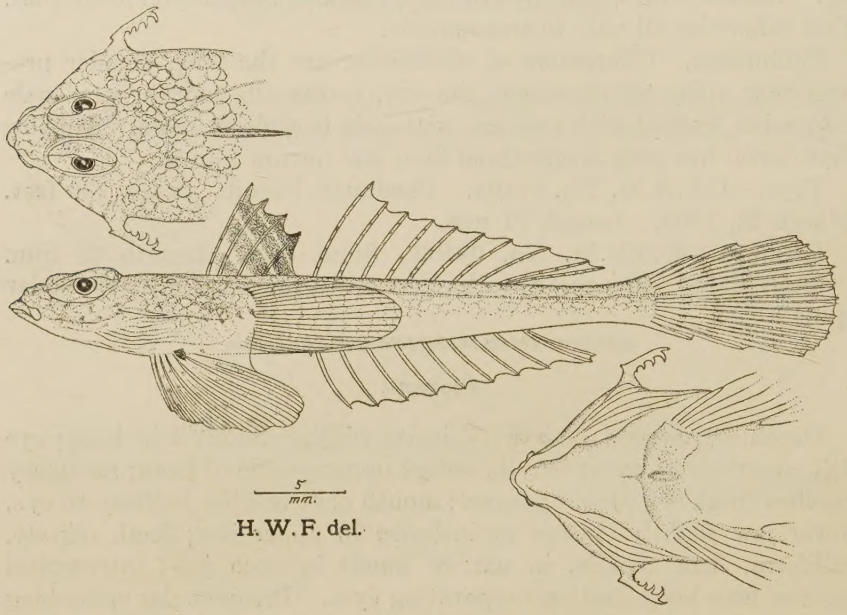

FIGURE 4.—*Callionymus marisinensis*, new species. Type.

Paratype.—U.S.N.M. No. 99411. Tinakta Island (N.), S. 80° W., 3.3 miles (lat. 5°12′30″ N., long. 119°55′50″ E.). February 21, 1908. Length 36 mm [D. 5157.]

(*marisinensis*, of China Sea.)

CALLIONYMUS HUDSONI, new species

FIGURE 5

Depth 6⅔; head 3⅓, width 1⅕. Snout 3⅛ in head (in profile); eye 3, slightly greater than snout; maxillary not reaching eye, length 4⅘ in head; mouth cleft 5⅛ in head from snout tip, extends halfway to eye, lower jaw well protruded in front; teeth very minute, in narrow villiform band, firm, more easily felt than seen without a lens; interorbital narrow, with large eyes set close. Preopercle ends in spine directed up and back, with small one at base in front and two large, subequal, recurved spines along its hind edge. Gill opening small, high, faces upward.

Lateral line high, complete, simple.

D. IV–9, 1, first 2 spines end in short filaments, first spine 1½ in total head length, first ray 1⅘; A. 7, 1, first ray 2⅖; caudal 1, rounded or convex behind; least depth of caudal peduncle 4⅛; pectoral 1$\frac{1}{10}$, rays 18; ventral rays I, 5, fin 2⅖ in fish without caudal.

Color in alcohol, very pale gray brown above, with slightly darker variable spots, blotches, and bars. Iris silvery to coppery gray. Entire under surfaces of head and body white. Fins all largely whitish. First dorsal with dark or blackish brown blotch on most membranes marginally. Few scattered pale brown spots on ventral rays.

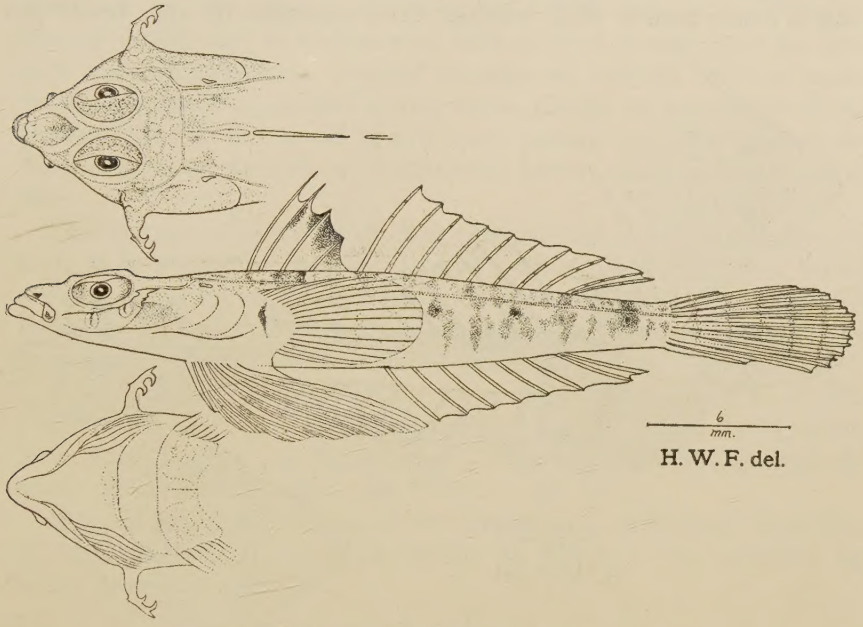

FIGURE 5.—*Callionymus hudsoni*, new species. Type.

Known only from the Philippines. Characterized by its moderate caudal, large ventrals, and coloration, the inner edge of the preopercular spine with only two recurved hooks.

Type.—U.S.N.M. No. 99412. Pandanan Island. Seine, 130 feet. March 23, 1909. Length 35 mm.

Paratypes.—U.S.N.M. No. 99415. Cabugao Bay, Catanduanes Island. From seine. June 9, 1909. Length 40 mm.

U.S.N.M. No. 99417. Cebu market, Cebu. March 20, 1909. Length 50 mm.

U.S.N.M. No. 99414. Mantacao Island. From seine. April 8, 1908. Length 38 mm.

U.S.N.M. No. 99416. Port San Vicente, Luzon side (beach). November 18, 1908. Seine 130 feet. Length 29 mm.

U.S.N.M. No. 99413. Reef opposite Cebu, Cebu Island. April 7, 1908. Length 44 mm.

(Named for Capt. Charles B. Hudson, whose valuable figures of Japanese dragonets were published in 1903.)

CALLIONYMUS LONGI, new species

FIGURE 6

Depth 9; head 4$\frac{1}{10}$, length 1$\frac{1}{10}$ in its width. Snout 2$\frac{7}{8}$, in head; eye 2$\frac{7}{8}$, subequal with snout; maxillary nearly reaches orbit, length 3$\frac{1}{8}$ in head; mouth cleft reaches three-sevenths to eye, lower jaw

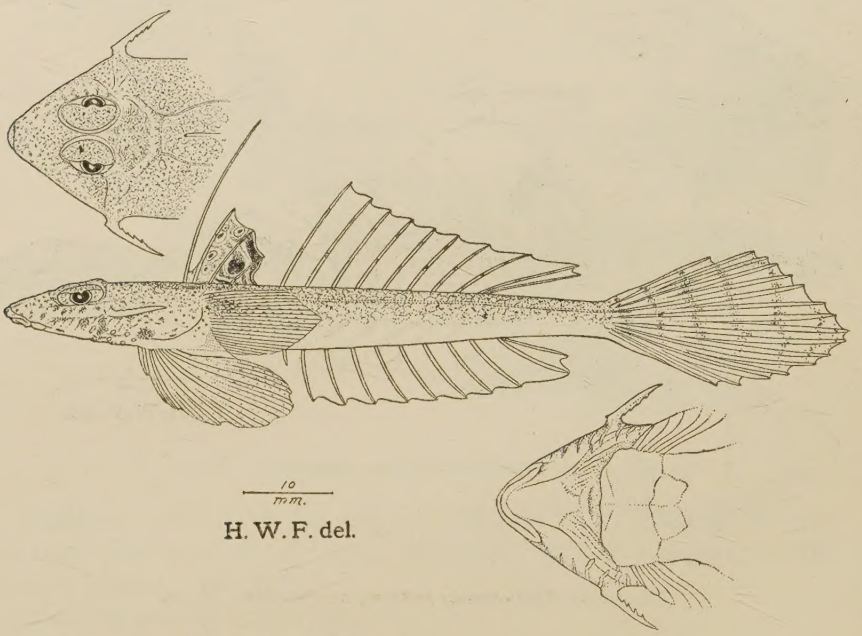

FIGURE 6.—*Callionymus longi*, new species. Type.

shorter or included in upper; teeth villiform, fine, close set, simple, conic, in bands in jaws, narrowing along sides of jaws; interorbital bony frenum separating large close set eyes. Preopercular spine very long, slender, but slightly curved and ends behind in a long slender spine, four low broad spinules along its inner edge, and small forward directed basal spine in front.

Lateral line complete, high along side of back, with loop above close before caudal fin, and extending out on caudal base. Occiput finely striate, with striae not greatly developed.

D. IV–9, 1, first spine slender, ends in free filament 3$\frac{1}{4}$ in fish without caudal; A. 9, 1, first ray 2$\frac{3}{4}$ in head measured to gill opening; least depth of caudal peduncle 4$\frac{1}{4}$; pectoral 1$\frac{1}{4}$, rays 20; caudal 2$\frac{3}{8}$ in rest

of fish; ventral 3⅝, rays I, 5. Anal papilla conic, pointed, nearly long as pupil.

Color in alcohol, back and upper surfaces light brown, warmer tint on trunk and tail. Back also variegated with pale and dark rings and marbling. Under surfaces of body white, with pale buff and brown tints. Side of head with rather large brown spots interspersed with white dots and small spots, and on under sides of head variable, inclined, short white lines and bars. Eyes brown, variegated with dark blotches above. First dorsal whitish, with black pale-edged ocelli, on last two membranes largest and with dark to black bands. Second dorsal pale or transparent with several brown spots on each ray. Anal transparent. Caudal transparent whitish, with six transverse bars made up of dark-brown spots, chiefly on upper half of fin. Pectoral white, with small brown spots mostly on upper part of fin. Ventral pale or whitish, with scattered brown spots on hind half of fin.

Philippines. Known by the long preopercular spine 1+⅝ times eye, ends in a backward directed barbed point behind; four low broad spinules along its upper edge and a small basal forward directed spine in front. The first dorsal spine is an extended filament, little shorter than head. Entire under surfaces uniformly white.

Type.—U.S.N.M. No. 99418. Pajumajan Island (W.), S. 2° W., 2 miles (lat. 5° 22′ 55″ N., long. 120° 15′ 45″ E.), Sulu Archipelago, Tawi Tawi Group. In 34 fathoms. February 18, 1908. Length 98 mm. Bureau of Fisheries (No. 22922). [D. 5152.]

(Named for Bayard Long, of the Department of Botany, Academy of Natural Sciences of Philadelphia, to whom I am indebted for many American fishes.)

CALLIONYMUS BRUNNEUS, new species

FIGURE 7

Depth 9½; head 3⅞, long as wide. Snout 2¾ in head; eye 3⅛, 1⅛ in snout; maxillary reaches halfway to eye, length 4⅛ in head; mouth cleft reaches two-fifths to eye, lower jaw included; premaxillaries very protractile; teeth fine, conic, pointed, villiform, in bands in jaws, broader anteriorly and on sides narrowing back; interorbital narrow bony frenum, separating large closely set eyes. Preopercular spine large, slender, slightly longer than eye, nearly straight, ends in slender long spine, with five recurved denticles along inner edge, and small subbasal denticle in front directed forward.

Lateral line complete, runs little high along side of back and out on caudal base. Parietal region smooth, only some very feeble radiating obscure striae, little visible except under a lens.

D. IV–9, 1, first spine 1½ in head, first ray 1½; A. 9, 1, first ray 2⅞; caudal 3⅛ in rest of fish, cuneate; least depth of caudal peduncle 4⅔ in head; pectoral 1⅓, rays 19; ventral rays I, 5, fin 3⅗ in fish without caudal. Anal papilla depressed, narrowly triangular, two-fifths of eye.

Color in alcohol, back and upper surfaces brown, variegated with slightly darker rings, arcs, circles, and spots, all producing little contrast. Under surface of body uniform whitish, with buff and pale-brown suffusions. Several well-inclined dark-brown bars along lower side of head and cheek. Opercle with brown spots, these extending on connecting membrane below to ventral fin. Obscure brown spots

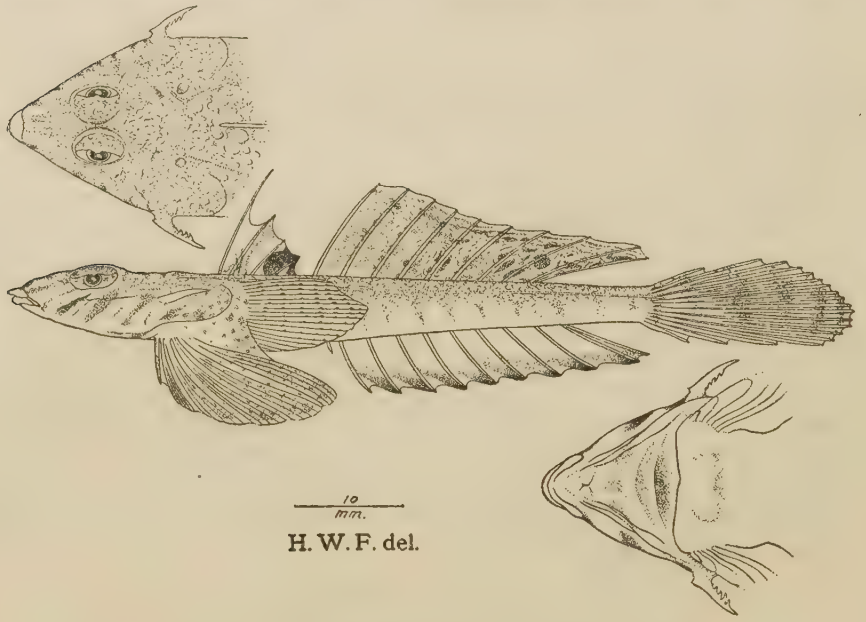

FIGURE 7.—*Callionymus brunneus*, new species. Type.

little inclined back and below along side of tail. Eyes gray, brown above with darker spots and blotches. First dorsal with pale brown membrane, large black blotch on two last membranes, with several dark streaks on first two membranes. Second dorsal transparent, greatly variegated with dark brown spots, ocelli and blotches. Anal transparent basally, with blackish brown shading terminally on each membrane and lower edge of each interradial membrane white in front. Caudal pale to whitish with six transverse dark bars, mostly made up of spots. Pectoral whitish, upper portion with small numerous dark-brown spots. Ventral whitish basally, dark brown terminally, upper outer surfaces also thickly spotted with still deeper brown

Philippines. A species easily known by its general brown appearance. Its long slender straight preopercular spine ends in a slender

spine directed straight back, with five small antrorse spines along its upper edge, and a small spine directed forward from its base. First dorsal spine a little longer than the others in the male and less than the head. Last two dorsal membranes black and anal with a black submarginal line.

Type.—U.S.N.M. No. 99419. Balayan Bay, Taal. January 19, 1908. From fishermen's seine. Length 80 mm.

Paratypes.—U.S.N.M. No. 99420. Same data as for type. Length 67 to 78 mm. Seven specimens.

U.S.N.M. No. 99421. Subig Bay, Subig, southern Luzon. From seine. January 7, 1908. Length 34 to 52 mm. Two specimens.

(*brunneus*, brown.)

CALLIONYMUS PUNCTILATERALIS, new species

FIGURE 8

Depth 8; head 4⅘, length ⅘ of width. Snout 2 in head; eye 4, 2 in snout; maxillary reaches two-thirds to eye, ridges and edges entire; mouth cleft reaches halfway to eye, lower jaw slightly shorter and included in upper when mouth is closed; teeth in villiform bands in jaws, bands broken anteriorly; teeth strong, firm, conic, close set, and in quite narrow bands on sides of jaws; interorbital narrow, concave, width about equals diameter of pupil. Preopercular spine slender, 1½ times eye, ends in point behind; seven recurved small denticles along inner edge; small basal spine directed forward. Gill opening small, an orbital diameter behind eye.

Lateral line complete, but little waved or undulate, high along side of back. Parietals each with radiating striae.

D. IV–9, 1, first spine largely detached, prolonged, 3¼ in fish without caudal, first ray 1⅓ in head; A. 9, 1, first ray 2½; caudal 2⅞ in rest of fish; least depth of caudal peduncle 3½ in head; pectoral rays 20, fin 1⅘ in head; ventral rays I, 5, fin 3¾ in fish without caudal. Anal papilla slender, tapering, depressed, three-fourths length of orbit.

Color in alcohol, burnt umber or warm brown above, variegated with many close-set intricated darker marblings, arcs, circles, and vermiculating lines. Lower surfaces uniform whitish. All along sides of head and body very numerous thickly strewn, dark to blackish-brown spots. On lower side of head and thorax spots larger or as blackish blotches, especially contrasted with whitish of under surfaces. Iris gray, variegated with darker spots on orbit above. First dorsal with first and second membranes largely white, marked with some black white-ringed ocelli; other membranes blackish, with four or five oblique whitish lines. Second dorsal with gray to black ocelli, variable on fin membranes. Anal largely shaded gray-brown below or toward margins. Caudal marked with large white-ringed ocelli on greater

upper portions, and fin otherwise with variable more or less transverse gray waved parallel lines or narrow bands. Pectoral whitish, with numerous small blackish-brown spots on upper part. Ventral whitish, rays dark brown terminally and axillary membrane finely spotted with black.

Philippines. Known by its small dark spots scattered over the side of the body in the male.

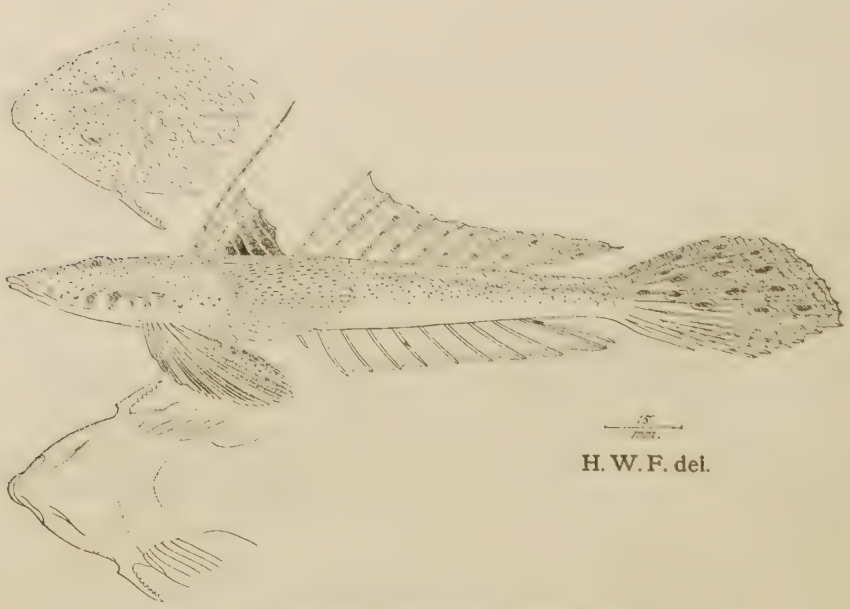

FIGURE 8.—*Callionymus punctilateralis*, new species. Type.

Type.—One example. U.S.N.M. No. 99422. Tigbauan, Panay Island. May 14, 1929. Male. Length 162 mm.

Paratypes.—Four examples. U.S.N.M. Nos. 99423 and 99424. Below mouth of Mindanao River, Cotabato, Mindanao. Seine. May 20, 1908. Two males and two females. Length 52 to 84 mm.

(*punctum*, spot+*lateralis*, of the side.)

CALLIONYMUS KEELEYI, new species

FIGURE 9

Depth 7⅕; head 3⅘, long as wide. Snout 2⅖ in head; eye 3⅛, 1⅓ in snout; maxillary concealed; mouth cleft reaches halfway to eye, lower jaw little shorter; teeth villiform, fine, conic, simple, in rather wide short bands in jaws, form narrow band along each side of jaw; mandible shallow, rami not elevated inside mouth; interorbital narrow bony ridge separating large close set eyes. Preopercular spine ¾ of

eye, ends in small slightly recurved denticle, four more mostly larger ones along inner edge, and small basal denticle in front pointing forward.

Lateral line complete, high along side of back, simple, and extends out on caudal base. Parietal region smooth.

D. IV–9, 1, first 2 spines prolonged into long filaments, first longer or 1⅝ in fish without caudal, first ray 1½ in head; A. 9, 1, first ray 2¾; least depth of caudal peduncle 4; pectoral 1⅛, rays 19; ventral rays I, 5, fin 3⅛ in fish without caudal; caudal 1¾. Anal papilla conic, simple, depressed, long as pupil.

Color in alcohol, back and upper surfaces brown, variegated with darker and paler marblings. Eight diffuse or obscure median darker

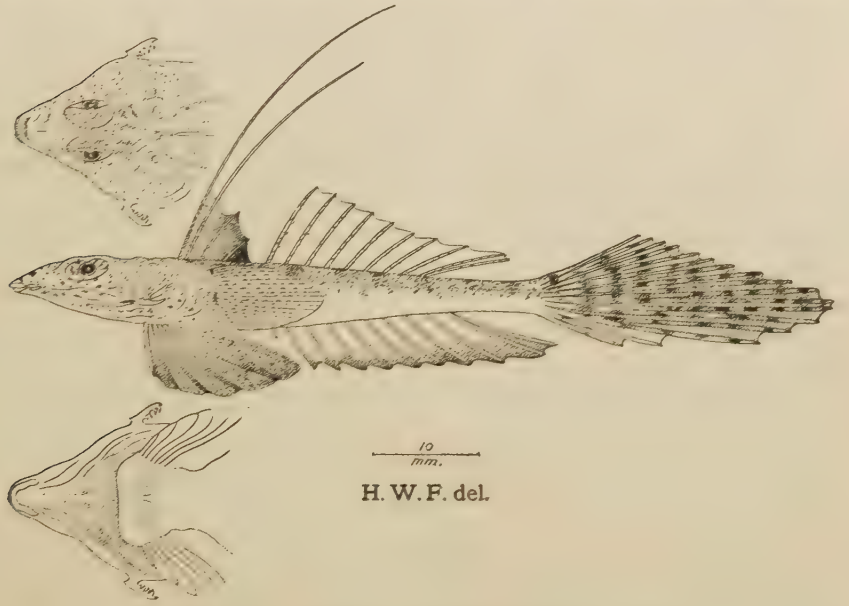

FIGURE 9.—*Callionymus keeleyi*, new species. Type.

blotches on back. Sides of head and body with more defined and contrasted dark spots on sides. Eyes gray, with silvery tints and darker markings. All under surfaces of body immaculate whitish. First dorsal dark gray to gray-black, especially on second and third membranes; some paler longitudinal lines on first two membranes. Second dorsal transparent, with scattered dark spots or specks on rays. Anal pale, dark to blackish brown marginally. Caudal whitish, gray terminally, and with a dozen irregular transverse rows of dark to blackish spots. Pectoral whitish, with numerous small, irregular, blackish-brown spots above. Ventral pale to whitish basally, dark to blackish brown terminally, and inner half of fin with connecting membrane marked with small dark to blackish dots.

Philippines. Known by the orbit 1⅓ in snout and first dorsal with two spines elongate filaments, fin dark, on last membrane black with white lines. Caudal with a dozen rows of dark spots and anal border black. Pectoral with many fine dark spots and ventral blackish terminally.

Type.—U.S.N.M. No. 99425. Cebu. April 17, 1929. Lt. H. C. Kellers. Length 80 mm.

(Named for Frank J. Keeley, of the department of mineralogy, Academy of Natural Sciences of Philadelphia.)

CALLIONYMUS SCHAAPII Bleeker

FIGURE 10

Callionymus schaapii BLEEKER, Nat. Tijdschr. Nederl.-Indië, vol. 3, p. 455, 1852 (type locality: Banka).—GÜNTHER, Catalogue of fishes in the British Museum, vol. 3, p. 148, 1861 (copied).—BLEEKER, Versl. Meded. Akad. Wet. Amsterdam, ser. 2, vol. 14, p. 94, 1879 (Singapore; Banka; Java).

Depth 7⅕ to 8½; head 4⅛ to 4⅜, length 1¼ in its width to width 1⅛ in its length. Snout 3 to 3½ in head; eye 3⅛ to 3¼, subequal with snout; maxillary reaches three-fifths to eye, entire; mouth cleft with rictus halfway in snout, lower jaw little shorter than upper, which protrudes in front; teeth very small, fine, simple, conic, close set, villiform, in narrow bands in each jaw; interorbital narrow, concave, with median longitudinal groove, bony width wide as pupil. Preopercular spine large, bent, ends in small terminal point, also similar small basal point in front directed forward, and along inner edge four or five rather large recurved denticles.

Lateral line high along back to caudal base, simple and continuous with loop above over caudal peduncle posteriorly. Parietals with fine, narrow striae.

D. IV–9, 1, first spines end in long filaments, second spine 1⅞ to 3½ in fish without caudal, first ray 1¾ to 1⅞ in head; A. 9, 1, first ray 2⅖ to 2⅝; caudal 2⅞ to 3 in rest of fish, convex behind; least depth of caudal peduncle 3⅓ to 4 in head; pectoral 1⅒ to 1+⅒, rays 20; ventral rays I, 5, fin slightly longer than head to twice length of head. Anal papilla simple, conic, three-sevenths of eye.

Color in alcohol, dull brown above, with many obscure darker spots, specks, and blotches; also many arcs, rings, and circles on trunk and tail above; on tail form four obscure dark saddles. Dark-brown spot about half size of orbit, on opercular flap. Dorsals and anals largely transparent. Caudal with five transverse darker bars. Pectoral with five or six dark transverse bars, more or less forming imperfect pale rings over upper part of fin. Ventral pale to whitish, each ray with four or five brown spots.

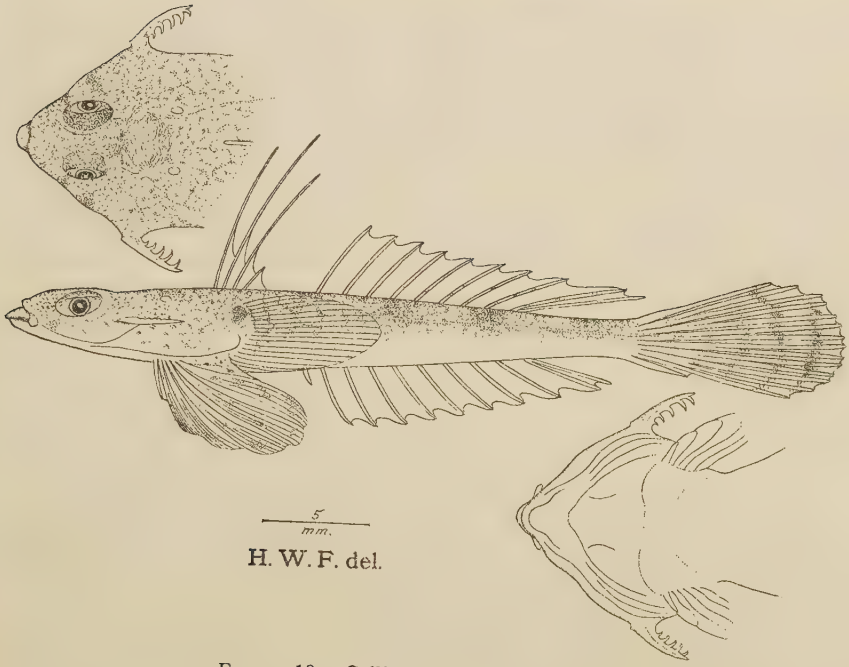

FIGURE 10.—*Callionymus schaapii* Bleeker.

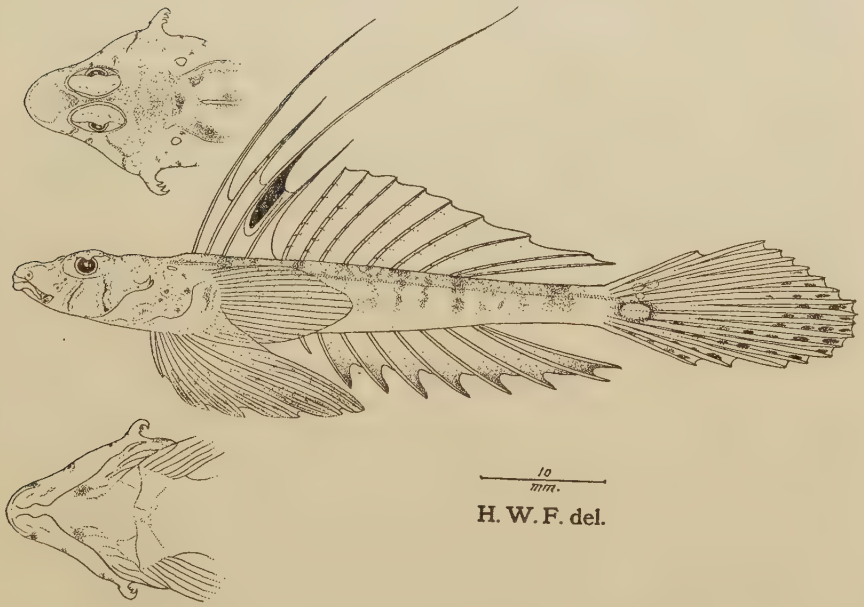

FIGURE 11.—*Callionymus distethommatus*, new species. Type.

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East Indies, Philippines. Resembles *Callionymus hudsoni* and *Callionymus marisinensis* but differs in having the preopercular spine 1+¼ times the eye, first three dorsal spines filamentous and prolonged, also the head striate behind eye. The species may be known by the very conspicuous ocellated black blotch below and before the pectoral origin.

Fifteen examples: Buenavista, Guimaras Island. Seine. January 14, 1909. Length 54 to 88 mm.

One example. Cebu. April 14, 1921. Lt. H. C. Kellers. Length 70 mm.

Four examples. Iloilo market, Panay. March 28, 1908. Length 57 to 85 mm.

CALLIONYMUS DISTETHOMMATUS, new species

FIGURE 11

Depth 7¼; head 4, broad as long. Snout 3⅕ in head; eye 3⅕, invades upper profile of head; maxillary reaches below front of eye, length 3½ in head; mouth cleft reaches two-thirds to eye, greatly protractile down and forward; teeth fine, villiform, in narrow bands in jaws; interorbital very narrow frenum, or bony ridge with median fine longitudinal groove, separating two large close-set eyes. Preopercle with moderate spine, ends in recurved denticle and followed by two others along hind edge; small basal spine in front directed forward.

Lateral line high along upper side of body, simple, complete. Parietal with very fine rugae.

D. IV–8, 1, spines all prolonged in filaments so third 1⅞ in fish without caudal, first ray 1⅞ in head; A. 7, 1, first ray 2⅕; least depth of caudal peduncle 4; pectoral 1, rays 18; ventral rays I, 5, fin 2⅔ in fish without caudal; caudal 2⅖, cuneate. Anal papilla conic, slender, 2 in orbit.

Color in alcohol, pale or light grayish above variegated with gray-brown and brown, forming five transverse dark bars or blotches on back. Snout pale above. Many small black to blackish-brown ocelli scattered on sides of head and top of head and on fins, also two below head at front of branchiostegal region. Iris gray and pearly. First dorsal with large black ocellus on third membrane. Second dorsal with some faint dark spots on rays. Anal blackish brown marginally. Caudal pale to whitish, with large pearly ocellus basally and many dark ocelli on lower and terminal part of fin. Pectoral largely whitish, only very faint trace of gray spots. Ventral whitish, grayish terminally and each ray with a few dark spots.

Philippines. A very handsome and ornamental species, with very definite color pattern.

Type.—U.S.N.M. No. 99426. Cebu market. August 28, 1909, Length 69 mm. Male. [1835.]

Paratypes.—U.S.N.M. No. 99429. Cebu market, Cebu. March 20, 1909. Length 40 mm. Female.

U.S.N.M. No. 99431. Cebu market. March 28, 1909. Length 41 mm. Male.

U.S.N.M. No. 99428. Cebu market. August 26, 1909. Length 52 to 58 mm. Males. Three examples.

U.S.N.M. No. 99427. Cebu market. August 28, 1909. Length 45 to — mm. Males. Two examples.

U.S.N.M. No. 99432. Guijulugan, Tañon Strait, east coast of Negros. Shore seine. April 2, 1908. Males. Length 48 to 59 mm. Two examples.

U.S.N.M. No. 99430. Port Matalvi, off western Luzon. Seine 150 feet. November 23, 1908. Females. Length 35 to 42 mm. Two examples.

(δίς, twice + στῆθος, breast + ὄμμα, eye; with reference to the double ocellated spot on each side of breast.)

CALLIONYMUS LEUCOBRANCHIALIS, new species

FIGURES 12 (male), 13 (female)

Depth 8½ to 10¾; head 3⅗ to 4⅘, long as wide. Snout 2¾ to 3 in head; eye 2⅔ to 3, subequal with snout; maxillary reaches seven-eighths to eye or little below front of eye; outer ridge in males with row of denticles, entire in female; mouth cleft horizontal, rictus three-sevenths in space to eye; lower jaw slightly included in male, jaws subequal or lower slightly protrudes in female; teeth fine, minute, villiform, crowded and in narrow bands in both jaws; interorbital narrow bony frenum, with longitudinal groove, bony width about half diameter of pupil. Preopercular spine long as eye, ends in short curved point behind, with three or four recurved denticles along its inner edge, and short denticle basal in front directed forward.

Lateral line complete, distinct, extends high along side of back out on caudal base, with or without loop over caudal peduncle above and just before caudal base. Parietal region smooth, radiating striae feeble and not very distinct.

D. IV–9, 1, or 10, 1, spines all prolonged into slender free filaments terminally reaching well into caudal base in males, first dorsal spine 1½ in head in females, first dorsal ray 1⅗ to 1⅘; A. 9, 1, first ray 2⅗ to 2⅔ in males; caudal nearly long as rest of fish, in females caudal 3 in rest of fish; least depth of caudal peduncle 4¾ to 5 in total head length; pectoral greater than head in males or 3⅔ in fish without caudal, subequal with head in females, rays 17 or 18; ventral rays I, 5, fin 3⅔ in fish without caudal or 1⅛ in head. Anal papilla long, slender, conic.

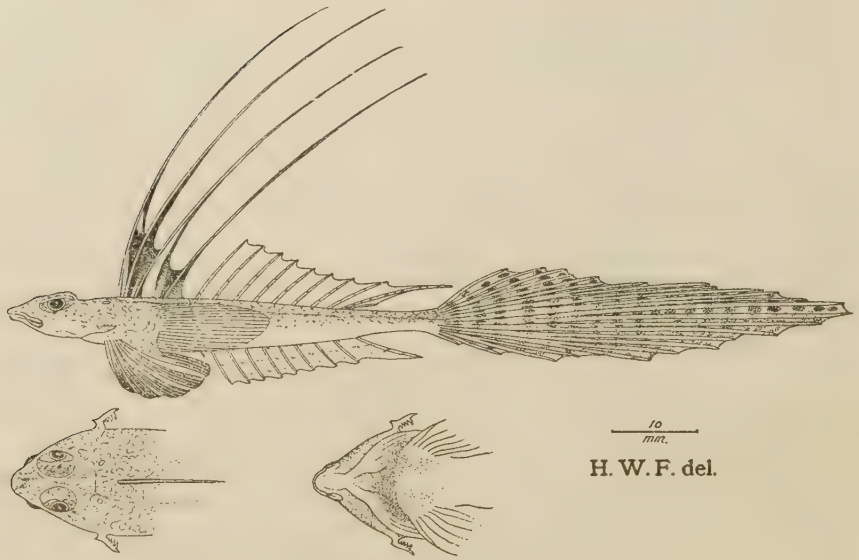

FIGURE 12.—*Callionymus leucobranchialis*. Type. Male.

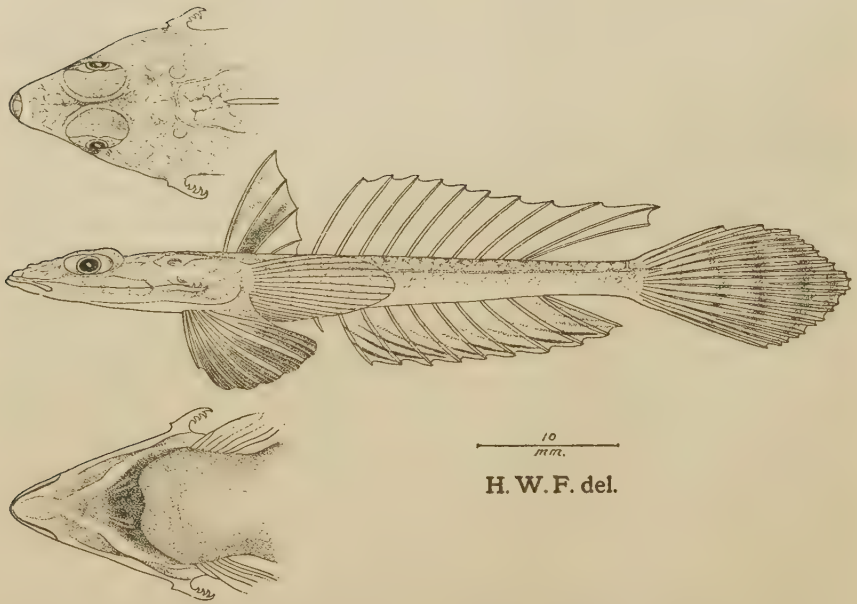

FIGURE 13.—*Callionymus leucobranchialis*. Paratype. Female.

Color in alcohol, light brown, on back with many faint and indistinct brown rings, arcs, and mottlings. Under surfaces largely whitish. Groove of lower lip each side of mandible, dark brown. Throat, chest, and breast rather light to pale brown, with strongly contrasted white gills. Iris silvery gray, with brown variable lines or arcs. First dorsal variegated with white marks on dark gray-brown background in male, less contrasted in female. Second dorsal pale or transparent whitish, with dull brownish spots on rays. Anal similar to second dorsal, or with oblique dark streaks below. Caudal pale or whitish basally, with five to seven transverse series of large rounded dark-brown spots, in closed fin forming transverse bands; terminally fin darker or brown with still darker mottling or obscure blotches. Pectoral pale, with about nine transverse brown lines. Ventral whitish basally and marked with many inconspicuous brown spots; fin gray black terminally.

Philippines. Apparently approaches *Callionymus neptunia* Seale [4] based on examples 160 to 190 mm. It differs from that species in the preopercular spine robust, but with the terminal spine small and straight anterior basal spine directed forward well developed, and only four large strong denticles along the upper edge of the spine. Moreover the four dorsal spines are greatly elongated and reach the basal part of the caudal fin. The coloration is also different.

Type.—U.S.N.M. No. 99393. San Fernando Point Light, N. 39°E., 8.4 miles (lat. 16°30′36″ N., long. 120°11′06″ E.), west coast of Luzon. In 45 fathoms. May 11, 1909. Length 99 mm.

Paratypes.—U.S.N.M. No. 99399. Same data as for type. Length 43 to 97 mm. Six specimens.

U.S.N.M. No. 99400. Bacoor, Luzon. Seine. June 15, 1908. Length 60 mm.

U.S.N.M. No. 99395. Same data as preceding. Four specimens. Length 38 to 59 mm.

Other specimens.—U.S.N.M. No. 99403. Bolalo Bay, Malampaya Sound, Palawan Island. Dynamite. December 21, 1908. Length 42 to 73 mm. Two examples.

U.S.N.M. No. 99394. Cavite and San Roque markets. June 27, 1908. Length 53 mm. 12819.

U.S.N.M. No. 99396. Cebu market. April 5, 1908. Length 73 mm. 8564.

U.S.N.M. No. 99401. Manila Bay, Luzon. December 12, 1908. Length 42 mm.

U.S.N.M. No. 99402. Manila Harbor, Luzon. Seine of 34 feet. March 16, 1908. Length 68 mm.

U.S.N.M. No. 99397. Outside harbor wall, Manila Bay, Luzon. Dredge. December 12, 1907. Length 40 to 43 mm. Three examples.

[4] Philippine Journ. Sci., vol. 4, No. 6, p. 539, 1909 (type locality: Balayan Bay, Luzon).

U.S.N.M. No. 99404. Philippines. Length 48 to 65 mm. Two examples.

U.S.N.M. No. 99405. D. 5442. San Fernando Point Light, N. 39° E., 8.4 miles (lat. 16°30′36″ N., long. 120°11′6″ E.), west coast Luzon. May 11, 1909. Length 28 to 73 mm. Five examples.

U.S.N.M. No. 99398. Sandakan Bay, Borneo. Seine. March 2, 1908. Length 58 to 66 mm. Three examples.

(λευκός, white+βράγχια, gills)

Besides the above several other interesting species in the collection are:

CALLIONYMUS SAGITTA Pallas

Callionymus sagitta Pallas, Spicilegia zoologica, vol. 8, p. 29, pl. 4, figs. 4–5, 1770 (type locality: Amboyna).—Jordan and Richardson, Bull. U. S. Bur. Fisher., vol. 27, p. 283, 1908 (Manila).—Borodin, Bull. Vanderbilt Marine Mus., vol. 1, art. 2, p. 61, 1930 (Manila Bay).—Herre, Fishes Herre 1931 Philippine Expedition, p. 94, 1934 (Manila).

22169. Davao, Mindanao. May 16, 1908. Length 58 mm.

One example. Cebu. April 24, 1909. Lt. H. C. Kellers. Length 66 mm.

CALLIONYMUS BENITEGURI Jordan and Snyder

Callionymus beniteguri Jordan and Snyder, Proc. U. S. Nat. Mus., vol. 23, p. 370, pl. 17, 1900 (type locality: Tokyo Bay).—Jordan and Fowler, ibid., vol. 25, p. 956, 1903 (Misaki, Otaru, Wakanoura, Kobe, Hakodate, Aomori, Hiroshima, Nagasaki, Matsushima Bay).—Jordan and Hubbs, Mem. Carnegie Mus., vol. 10, No. 2, p. 317, 1925 (Toba, Kobe, Tatoku Island, Mikawa Bay).—Schmidt, Trans. Pacific Committee Acad. Sci. U. S. S. R., p. 143, 1931 (Nagasaki).

Calliurichthys beniteguri Franz, Abh. Bayer. Akad. Wiss., vol. 4, Suppl. Band 1, p. 84, 1910 (Yokohama).

U.S.N.M. No. 49402. Bay of Tokyo, Japan. K. Otaki. Length 185 mm. Type.

One example. Miyazaki, Japan. Rev. Cyrus A. Clark. Oberlin College. Length 105 mm.

CALLIONYMUS VALENCIENNEI Schlegel

Callionymus valenciennei Schlegel, Siebold's Fauna Japonica, Poissons, pts. 7–9, p. 153, pl. 78, fig. 3, 1845 (type locality: Nagasaki, Japan).—Jordan and Hubbs, Mem. Carnegie Mus., vol. 10, No. 2, p. 317, 1925 (Kobe, Toba).

Callionymus valenciennesi Bleeker, Versl. Meded. Akad. Wet. Amsterdam, ser. 2, vol. 3, p. 238, 1869 (Japan).

Calliurichthys valenciennesi Franz, Abh. Bayer. Akad. Wiss., vol. 4, Suppl. Band 1, p. 84, 1910 (Sagami Bay; Aburatsubo).

Callionymus japonicus (not Houttuyn) Valenciennes, Histoire naturelle de poissons, vol. 12, p. 299, 1837 (Japan).

Callionymus simplicicornis Valenciennes, ibid., p. 303, 1837 (type locality: Guam).

Callionymus reevesi (part) Richardson, Zoology of the voyage of H. M. S. *Sulphur*, Ichthyology, p. 60, pl. 36, 1844 (female; on drawing made in Canton, not type).

Callionymus flagris JORDAN and FOWLER, Proc. U. S. Nat. Mus., vol. 25, p. 952, fig. 7, 1903 (type locality: Tsuruga; Tokyo; Aomori; Kobe; Nagasaki; Owari Bay; Matsushima Bay).

Two examples. China. A. de W. Sowerby. Length 64 to 75 mm.

Genus SYNCHIROPUS GILL

ANALYSIS OF SPECIES

a^1. Second dorsal elevated; pectoral long, reaches halfway to caudal---**pallidus**
a^2. Second dorsal lower; pectoral moderate, reaches ⅔ to caudal------**grinnelli**

SYNCHIROPUS PALLIDUS, new species

FIGURE 14

Depth 6⅕; head 3¼, wide as long. Snout 4 in head (in profile) to gill opening; eye 2⅘, greatly exceeds snout; maxillary reaches below

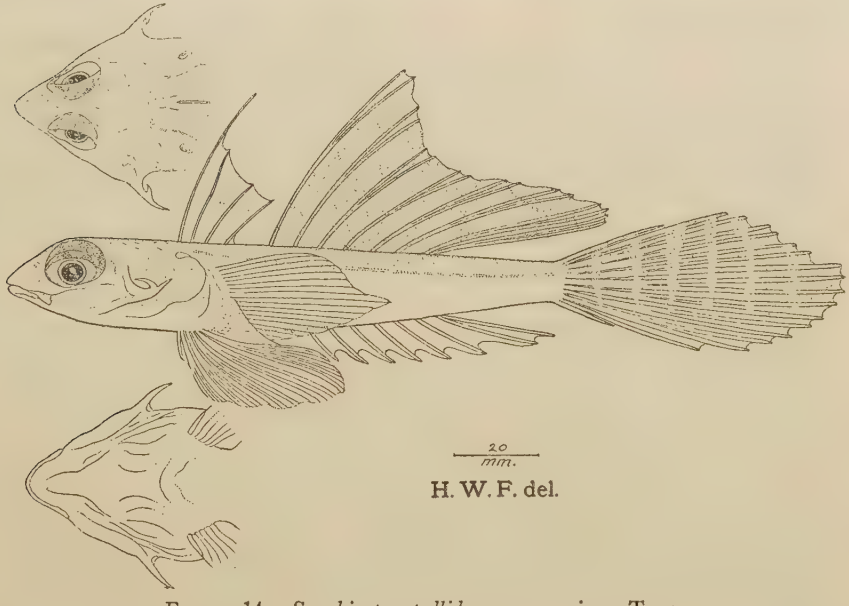

FIGURE 14.—*Synchiropus pallidus*, new species. Type.

front of eye, length 3⅓ in head to gill opening, entire; mouth cleft reaches three-fourths in snout, lower jaw very slightly shorter; jaws greatly protractile down and forward; teeth small, very close set, villiform, in bands in jaws which narrowed posteriorly or along sides of jaws; bony interorbital narrow, width two-thirds of pupil, shallowly concave; preopercle spine less than eye, curved, ends in slender spine and rather large forward curved denticle on inner upper edge; no basal spinule in front.

Lateral line complete, simple, extends on caudal base, and its course little high along side of body. Parietals striate, rather smooth.

D. IV–7, 1, first spine terminally free, equals head, first ray 2½ in fish without caudal; A. 7, 1, first ray 3⅝ in head to gill opening; least depth of caudal peduncle 4; pectoral 1⅛, rays 19; ventral rays I, 5, fin 3⅛ in fish without caudal; caudal 2, cuneate. Anal papilla very short, conic, simple.

Color in alcohol, very pale brown above, whitish below. Iris copper color, dark gray on eyes above. Fins all pale to transparent. First dorsal with eight transverse and slightly inclined pearl-white lines and about six on caudal.

Known by its very pale general coloration and the second dorsal with eight transverse, pearly white, wide-spaced, narrow bands, the caudal with six.

Type.—U.S.N.M. No. 99437. No. 1355. Length 190 mm. to end of broken caudal.

(*pallidus*, pale.)

SYNCHIROPUS GRINNELLI, new species

FIGURE 15

Depth 6¾; head 3⅝, width 1. Snout 4⅛ in head; eye 2¾, greatly exceeds short obtuse snout, with orbits conspicuously impinging on upper profile of head; maxillary reaches below front part of orbit; mouth cleft slopes little down and forward, rictus extending very nearly opposite front edge of orbit and lower jaw slightly shorter than upper; teeth small, simple, conic, close set or crowded, uniformly villiform and in moderate bands in jaws, which little broader anteriorly; no teeth on palate; interorbital narrow bony frenum separating very large orbits and traversed by a shallow longitudinal groove. Preopercular spine large, strong, ends in slightly upturned spine and another on inner edge recurved, and both invested in connecting membrane. Gill opening rather large, nearly opposite first dorsal origin.

Lateral line complete, high at first along back, posteriorly falls until axial along middle of side of tail and caudal peduncle on to caudal base. Parietal areas of cranium osseous, with pits and short anastomosing radiating bony branches. Preorbital broadly triangular, with fine radiating striae.

D. IV–9, 1, first 2 spines with ends flexible and filamentous, first spine 1½ in head, first ray 1⅝; A. 7, 1, first ray 3¼; caudal cuneate or hind edge obliquely and slightly convex down to lower branched rays, which longest and fin 3 in rest of fish; least depth of caudal peduncle 5 in head; pectoral 1¼, rays 20; ventral rays I, 5, length 1 in head Anal papilla very short, depressed, blunt, cutaneous flap.

Color in alcohol, pale buff-brown, inclining to whitish below. Upper part of back with very faint traces of light blotches or spots, variable though rather large. Iris grayish. First dorsal whitish, with large black ocellus terminally on third membrane, and other membranes with white and brownish shades. Second dorsal pale, with some pure-white blotches medially or in upper half, in some lights these markings reflected as brownish. A pale or transparent like second dorsal, with subterminal dark-brown band, beyond or on edge of narrow white line. Caudal transparent with white markings as three imperfect transverse bands sloping little back, as upper part of fin,

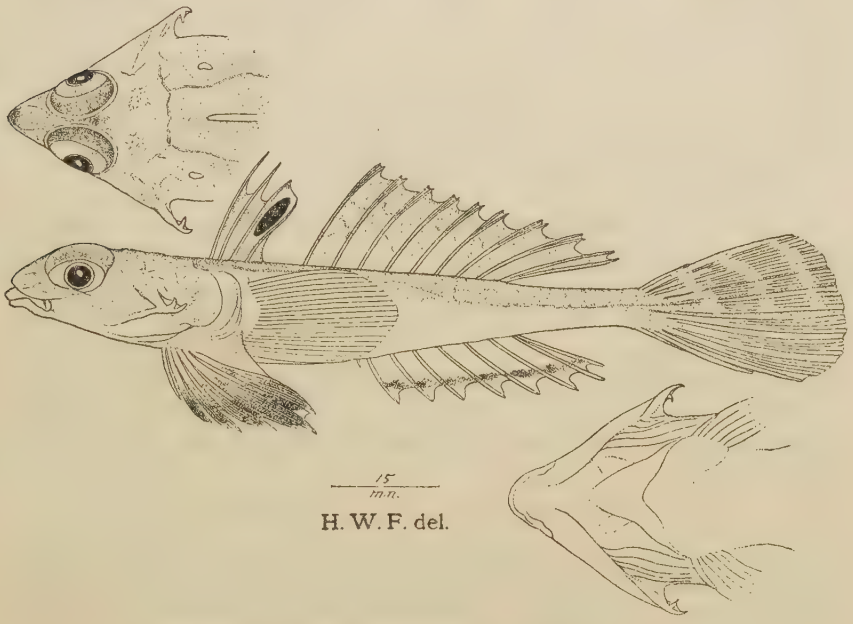

FIGURE 15.—*Synchiropus grinnelli*, new species. Type.

and two large white basal blotches. Pectoral transparent, with obscure whitish basally and two very imperfect whitish bars above transversely. Ventral pale to whitish, with two dark blotches on each ray, outer or subterminal darker, and fin edge narrowly white.

A handsome species with large orbits greatly exceeding length of snout. Preopercular spine half length of orbit, ends in upturned spine, besides another spine above slightly bent forward, but no lower basal spine. The species is known by its peculiar physiognomy, the greatly enlarged orbits, and bony broad triangular postorbital. Dorsal and anal both with membranes notched marginally.

Type.—U.S.N.M. No. 99436. D. 5475. San Bernardino Light, S. 27° W., 11 miles (lat. 12°55′26″ N., long. 124°22′12″ E.), east

coast of Luzon, San Bernardino Strait to San Miguel Bay. In 195 fathoms. June 24, 1909. [1699.] Length 118 mm.

(Named for the late Dr. Joseph Grinnell, of the Museum of Vertebrate Zoology, Berkeley, Calif.)

Besides the above, there are several very handsome specimens of the following:

SYNCHIROPUS OCELLATUS (Pallas)

Callionymus ocellatus Pallas, Spicilegia zoologica, vol. 8, p. 25, pl. 4, figs. 1–3, 1770 (type locality: Amboina).—Weber, *Siboga* Expedition, vol. 57, Fische, p. 524, 1913 (Beo; Kabaena Island; Ambon; Nusa Laut; Tiur).

Synchiropus ocellatus Jordan and Richardson, Bull. U. S. Bur. Fisher., vol. 27, p. 282, 1907 (1908) (Calayan).—Herre, Fishes Herre 1931 Philippine Exped., p. 94, 1934 (Dumaguete).

Callionymus punctulatus Lacépède, Histoire naturelle des poissons, vol. 2, pp. 328, 340, 1800 (type locality: No locality).

Three examples. Gubat Bay, Luzon. Tide pools. June 23, 1909. Length 31 to 73 mm. [1693, 1696.]

SYNCHIROPUS SPLENDIDUS (Herre)

Callionymus splendidus Herre, Philippine Journ. Sci., vol. 32, p. 416, 1927 (type locality, Bungau).—Whitley, Rec. Australian Mus., vol. 16, No. 4, p. 222, pl. 17, figs. 1 a–b, 1927 (Hayman Island reef, Whitsunday Group, Great Barrier Reef, Queensland).

Synchiropus splendidus Giltay, Mém. Mus. Roy. Hist. Nat. Belge, Hors sér., vol. 5, fasc. 3, p. 84, 1933 (reference).

One example. Biri Channel. June 1, 1909. Dynamite. Length 70 mm. [1545.]

Genus ELEUTHEROCHIR Bleeker

Eleutherochir Bleeker, Versl. Meded. Akad. Wet. Amsterdam, ser. 2, vol. 14, p. 103, 1879. (Type, *Callionymus opercularioides* Bleeker, orthotypic.)

Brachycallionymus Herre and Myers, in Herre, Proc. Biol. Soc. Washington, vol. 49, p. 12, 1936. (Type, *Brachycallionymus mirus* Herre=*Callionymus opercularioides* Bleeker, orthotypic.)

There is hardly any question that the small specimens named as *Brachycallionymus mirus* Herre are the young of *Eleutherochir opercularis*.

Eleutherochir differs from the other genera especially in its even head with straight profile. The gill opening resembles that of *Synchiropus*, but is larger and hidden under the opercle, which is extended back in a free-pointed lobe.

ELEUTHEROCHIR OPERCULARIS (Valenciennes)

Callionymus opercularis Valenciennes, Histoire naturelle des poissons, vol. 12, p. (228) 305, 1837 (type locality: "L'embouchure de la rivière d'Arian-Coupan").—Day, Fishes of India, pt. 2, p. 323, 1876 (Pondicherry; Madras).—Weber, *Siboga* Expedition, vol. 57, Fische, p. 522, 1913 (Menado; Ambon).

Synchiropus opercularis GILL, Proc. Acad. Nat. Sci. Philadelphia, 1858, p. 130 (reference).—HERRE, Fishes Herre 1931 Philippine Expedition, p. 95, 1934 (Lemery).

Callionymus opercularioides BLEEKER, Nat. Tijdschr. Nederl.-Indië, vol. 1, p. (30) 32, 1850 (type locality: Padang, Sumatra).

Eleutherochir opercularioides BLEEKER, Versl. Meded. Akad. Wet. Amsterdam, ser. 2, vol. 14, p. 103, 1879 (Sumatra; Bali; Celebes; Batjan; Ceram; Amboina; Guebe).

Brachycallionymus mirus HERRE, Proc. Biol. Soc. Washington, vol. 49, p. 12, 1936 (type locality: Celebes; Philippines).

Two examples. Camp Overton, Mindanao. August 15, 1909. Electric light. Length 24 mm.

Nine examples. Malabang. May 21, 1908. Electric light. Length 20 to 23 mm.

One example. Nato. June 18, 1909. Electric light. Length 24 mm.

One example. Taal. February 20, 1909. Electric light. Length 20 mm.

U.S.N.M. No. 98827. Romblon. March 25, 1908. *Albatross* Collection. Length 16 mm. Paratypes of *Brachycallionymus mirus*. Two examples.

U.S.N.M. No. 98828. Nasugbu, Batangas Province. January 15, 1908. *Albatross* Collection. Length 15 mm. Paratype of *B. mirus*.

22170. Davao, Mindanao. Seine 150 feet. May 16, 1908. Length 59 to 85 mm. Six examples.

20824. Lingayen Gulf, Luzon. May 11, 1909. Seine 500 feet. Length 77 mm.

One example. Nasugbu, Luzon. Seine. January 16, 1908. Length 52 mm.

13959. Paluan Bay, Mindoro. Seine 130 feet. December 11, 1908. Length 37 to 70 mm. Three examples.

24132. Port San Vicente, Luzon. Seine 130 feet. November 18, 1908. Length 57 mm.

Two examples. San Vicente Harbor, Luzon shore. November 13, 1908. Seine. Length 54 to 59 mm.

ELEUTHEROCHIR MCCADDENI, new species

FIGURE 16

Depth 7; head 3, width 1¼. Snout 3⅓ in head; eye 3, slightly greater than snout; maxillary reaches opposite front of eye, entire; mouth but little inclined from horizontal, mouth cleft with rictus reaching halfway to eye, and lower jaw well protruded in front; teeth fine, conic, simple, close set, villiform, very minute, and set in inconspicuous narrow band above; lower teeth uniserial, rather large in comparison with upper, little curved in, situated along outer edge of

mandible and always visible, even in closed mouth; rami of mandible well elevated inside mouth; no teeth on palate; tongue small, entire, rounded and free in front; interorbital narrow, bony width two-fifths of eye, flattened. Preopercular spine curved back and up terminally, ends in strong spine, and two spines curved up and back on its upper edge. Opercular flap extends well back on pectoral base.

Lateral line complete, little high at first, becomes axial along side of tail.

D. IV–9, 1, spines not free, short, flexible, first 2⅓ in total head length, first ray 2; A. 10, 1, first ray 2⅓; caudal 3½ in rest of fish,

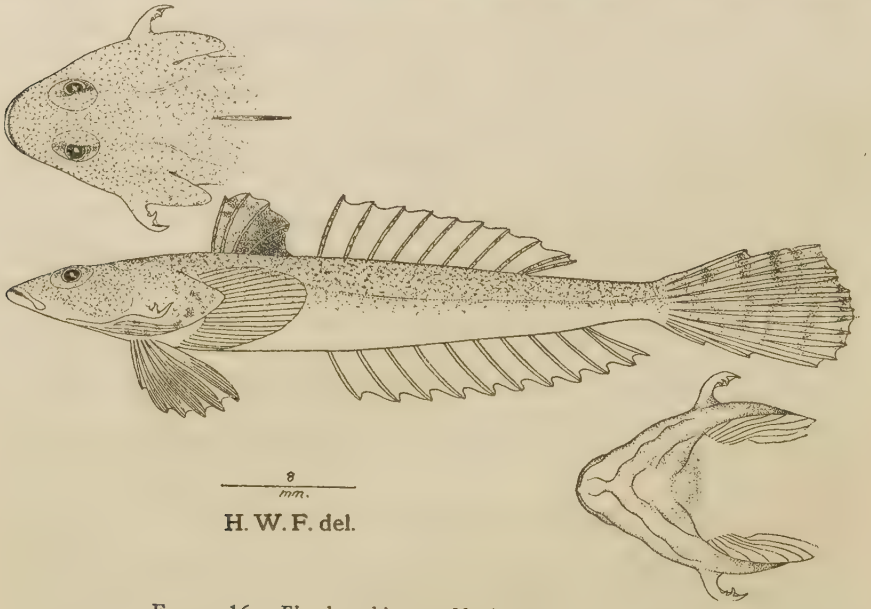

FIGURE 16.—*Eleutherochir mccaddeni*, new species. Type.

rounded convexly behind; least depth of caudal peduncle 3⅘ in head; pectoral 1⅘, rays 20; ventral rays I, 5, fin 1⅛ in total head length.

Color in alcohol, back and upper surfaces dull brown, everywhere more or less finely specked, dotted and spotted with darker, though markings nowhere much contrasted. On sides of head and opercle they are larger, coarser, and fewer. All over back above traces of dark arcs and circles, nowhere prominent. Entire under surfaces whitish, with dull-gray or brown tints. Eyes dark gray above, with dark blotches and mottling, pale to whitish below. First dorsal gray black, with some obscure pale blotches on first membrane. Second dorsal pale, with two dark spots on each ray. Caudal pale or light brown, with five transverse dark bars, last subterminal and empha-

sized with several blackish-brown spots. Anal transparent. Pectoral pale, with four very slightly darker transverse bars above. Ventral pale.

Philippines. Known chiefly by the long preopercle spine and white color of the thorax.

Characterized by its dentition and especially by the long opercular flap encroaching on the pectoral fin base. Ventral without upper basal membrane connecting fin to lower outer part of pectoral. It differs from *Eleutherochir opercularis* in the projecting lower jaw, the crooked or arched terminal preopercular spine, narrower bony interorbital, and pale ventrals.

Type.—U.S.N.M. No. 99435. Hinunañgan Bay, Leyte. Seine. July 30, 1909. Length 52 mm.

(Named for David McCadden, formerly taxidermist in the Academy of Natural Sciences of Philadelphia, to whom I am indebted for many American fishes.)

DICALLIONYMUS, new genus

Type.—Callionymus goramensis Bleeker.

Body elongate, slender, depressed anteriorly. Head moderate, depressed, as seen from above tapering into rather narrowly triangular muzzle. Snout nearly pyramidal. Eye rather large, well invading upper profile of head, upper velum of eye invading pupil above. Mouth protractile down and forward, jaws subequal or lower little shorter. Maxillary reaches front of eye, entire. Teeth in villiform bands in jaws. Interorbital very narrow bony frenum, between large close-set eyes. Long preopercular spine 1½ times eye in length; with small basal denticle directed forward, terminal spine upturned and with five others along its upper edge. Gill opening small slit, concealed by opercular flap, which rounded and not reaching pectoral base. Upper lateral line normal, along upper side of back; lower lateral line extends only along lower side of tail, and like upper extended on caudal base. First dorsal spine elongate, filamentous, reaches back well into middle of second dorsal. Last dorsal ray nearly long as head and reaches well into caudal base. Edge of soft dorsal entire. Anal with a slight notch along edge of each membrane. Caudal but little longer than head, cuneate, lower median rays longest. Pectoral broad, little shorter than head. Ventral longer than pectoral, broad with inner membrane well connected up on pectoral base. Anal papilla simple point. Coloration pale, variegated.

Distinguished from *Synchiropus*, with which it was later placed by Bleeker, this genus is unique among the Callionymidae in the presence of two lateral lines. It resembles *Synchiropus* in its gill openings.

(δίς, two + *Callionymus;* with reference to the two lateral lines.)

DICALLIONYMUS GORAMENSIS (Bleeker)

Callionymus goramensis BLEEKER, Nat. Tijdschr. Nederl.-Indië, vol. 15, p. 214, 1858 (type locality: Goram Island).

Synchiropus goramensis BLEEKER, Versl. Meded. Akad. Wet. Amsterdam, ser. 2, vol. 14, p. 101, 1879 (Goram).

Eleven examples. Pandanan Island. Seine 130 feet. March 23, 1909. Length 33 to 71 mm.

AMORINAE, new subfamily

Type genus.—Amora Gray.

Long tentacle above each eye. Gill opening behind preopercular spine. Body spinulose. Two distinct dorsal fins.

Genus AMORA Gray

Amora GRAY, Illustrations of Indian zoology, Hardwicke, vol. 2, pl. 90, fig. 1, 1833–34. (Type *Amora tentaculata* Gray, monotypic.)

Anaora GRAY, ibid., in directions for arranging the plates. (Type, *Amora tentaculata* Gray.)

Body moderately elongate, little broader than deep. Head large, depressed moderately. Snout rather long. Eye large, elevated, but little advanced in head length. Mouth terminally inferior. Above each eye a filament, twice eye length. Gill opening behind preopercular spine. First dorsal begins over gill opening, with four spines, about high as second dorsal. Second dorsal with eight rays, last branched. Anal similar with seven rays; also last branched. Paired fins little shorter than head.

This genus, long overlooked, was originally established on the colored figure published and named by Gray as *Amora tentaculata*. Bleeker in 1879 appears to have been the last author that accepted it. Though he diagnosed the genus he failed to call attention to any of the specific characters, some of which are of sufficient importance to be readily made out. He mentioned that the body is spinulose, and this is better indicated by Gray's figure 1a, giving a dorsal view. This suggests that *Callionymus fimbriatus* Herre,[5] described with short conspicuous cutaneous filaments on the body, and otherwise largely in agreement, is a synonym of *Amora tentaculata* Gray.

AMORA TENTACULATA Gray

Amora tentaculata GRAY, Illustrations of Indian zoology, Hardwicke, vol. 2, pl. 90, figs. 1, a-b, 1833–34 (type locality: Amboina).—BLEEKER, Versl. Meded. Akad. Wet. Amsterdam, ser. 2, vol. 14, p. 107, 1879 (reference).

Synchiropus tentaculatus HERRE, Philippine Journ. Sci., vol. 35, p. 33, pl. 3, 1928 (type locality, Puerto Galera).

One example. Port Caltom. December 15, 1908. Caught in seine. Length 46 mm.

[5] The fishes of the Herre 1931 Philippine Expedition, p. 94, 1934 (type locality: Sitanki Reef).

Two examples. Port Galera, Mindoro. June 9, 1908. Caught in a seine. Length 36 to 48 mm.

One example. Romblon. March 26, 1908. Caught in seine. Length 62 mm. [817].

19319. Sandakan Bay, Borneo. March 2, 1908. Caught in seine. Length 39 mm.

[2158.] Great Tobea Island. Tide pool. December 15, 1909. Length 42 mm.

DRACULINAE, new subfamily

Type genus.—Draculo Snyder.

Only one dorsal, corresponds to second dorsal of other genera.

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